

HIGH PERFORMANCE STRUCTURAL SENSORS



	<i>High-Performance NRL Fiber Sensor</i>	Typical NRL Fiber Sensor	Conventional Resistance Strain Gage Sensor
Resolution ($\mu\epsilon$)			
Dynamic	~0.001	0.1	10-100
Static	1	1	10-100
Dynamic range (dB)	114	94	~74
Bandwidth (Hz)	~0-20,000	~0-360	Variable
Multiplexing ability	Excellent	Excellent	Poor
Drift compensation	Yes	Yes	Sometimes

The Naval Research Laboratory has developed a new, high-performance structural monitoring system based on interrogation of fiber optic Bragg grating sensors. The system uses a scanning Fabry-Perot filter for demultiplexing; a Mach-Zehnder interferometer for high-resolution grating interrogation; and a unique, all-passive algorithm to interrogate a 3x3 coupler at the interferometer output for strain conversion. The system is capable of demultiplexing an array of Bragg grating sensors and can be integrated or surface mounted on various structures, including bridges, buildings, dams, aircraft, spacecraft, and industrial equipment.

Features and advantages include:

- 10^{-9} strain resolution (~1-cm gage length)
- Frequency bandwidth from DC to several kilohertz
- Temperature compensation
- 114 dB dynamic range
- Readily multiplexed

Applications include:

- Structural health monitoring
- Performance and usage tracking
- Loading history
- Adaptive structures

Licenses are available to companies with commercial interest.

Points of Contact

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